Harvest Estimates: 6/12/2017 Subsistence Opportunity

Prepared by USFWS

This document presents harvest and effort estimates as well as fisher-trip information for the subsistence salmon fishery opportunity on the Kuskokwim River that occurred on June 12, 2017 within the Yukon Delta National Wildlife Refuge (YDNWR) boundaries. The production of these estimates was a highly collaborative effort between the U.S. Fish and Wildlife Service (USFWS), the Orutsararmuit Native Council (ONC), and the Kuskokwim River Inter-tribal Fisheries Commission (KRITFC) in cooperation with the Bering Sea Fisherman's Association (BSFA). **These estimates encompass the portion of the YDNWR between and including the villages of Tuntutuliak and Akiak**. Harvest and effort estimation was conducted by USFWS staff using the same methods as in 2016, as described in Staton and Coggins (2016). Please contact Ben Staton (benjamin_staton@fws.gov) for a copy of that report, or if you have any questions regarding these estimates.

Opportunity Details

The YDNWR federal inseason manager, with authority delegated by the Federal Subsistence Board and in consultation with the KRITFC, announced a subsistence fishing opportunity for Chinook salmon within the YDNWR waters for federally-qualified subsistence users. The opportunity was 12 hours in duration, starting at 12:00PM June 12 and ending at 11:59PM June 12.

Data Sources

- A total of **191** fisher interviews were used in this analysis.
  - **94** fisher interviews collected by ONC from the Bethel boat harbor were used.
  - **8** fisher interviews collected by ONC from Bethel area fish camps were used.
  - **44** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
  - **45** fisher interviews collected by USFWS law enforcement officers were used.
- **187** interviews were from drift boat fishers.
- **4** interviews were from set net fishers.
- USFWS flew **3** aerial surveys to count drift boats and set nets.

Effort Estimates

- A total of **523** drift boat trips were estimated to have occurred during the opportunity.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
  - **375** drift boats between 1:00PM and 2:30PM,
  - **367** drift boats between 6:00PM and 7:30PM, and
  - **253** between 8:00PM and 9:30PM.
- Of the drift boats counted on the second flight, we estimated that **64%** of them were also counted during the first flight.
- Of the drift boats counted on the third flight, we estimated that **94%** of them were also counted during the second flight.
- **0** drift boat trips were estimated to have began and ended during times that were not flown.
- We observed **61** set nets fishing during the opportunity.

Harvest Estimates

- An estimated total of **5,510 (4,430 - 6,720)** salmon were harvested.
  - An estimated total of **2,360 (1,880 - 2,890)** Chinook salmon were harvested.
  - An estimated total of **2,370 (1,670 - 3,240)** chum salmon were harvested.
  - An estimated total of **780 (530 - 1,070)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **200 (80 - 320)** total salmon (**81%** Chinook salmon, **19%** chum salmon, and **0%** sockeye salmon).

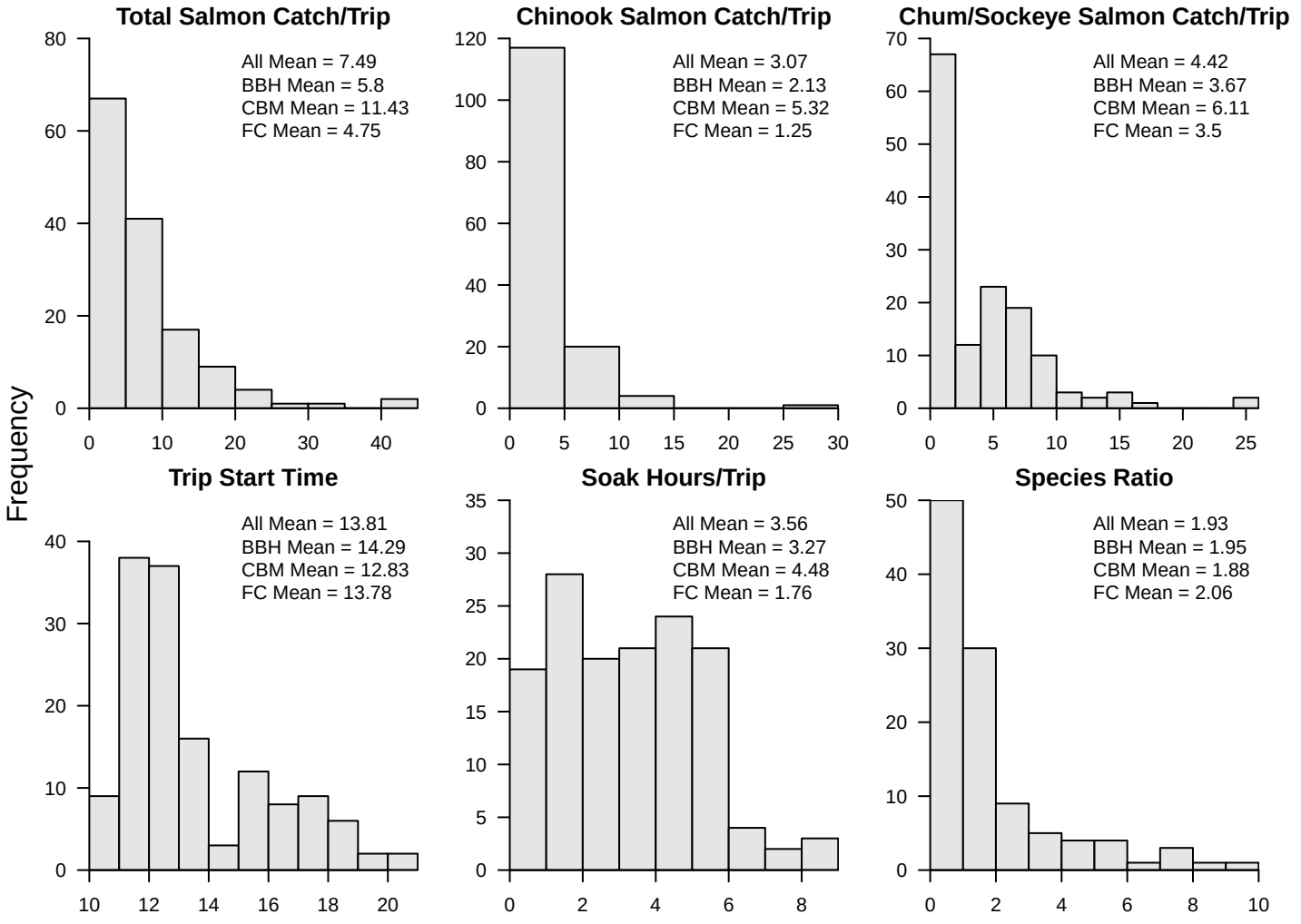
Table 1. Breakdown of relevant quantities by river stratum (area).

Stratum	Interviews	Max Drift Count	Set Net Count	Est. Drift Trips	Chinook Harvest	Chum Harvest	Sockeye Harvest
Tunt-Johnson	25	145	5	177	1,250	1,080	470
Johnson-Napaskiak	63	114	16	137	410	500	130
Napaskiak-Akaichak	96	114	28	165	380	590	100
Akiachak-Akiak	7	29	12	43	310	200	70
Total	**191**	**402**	**61**	**523**	**2,350**	**2,370**	**770**

Table 2. Specific quantities for the decision framework used by the USFWS and KRITFC. *Salmon/boat* is total salmon harvest per drift boat and *Ratio* is the chum/sockeye:Chinook salmon ratio. Quantities were calculated using the harvest estimates for each species and the number of estimated number of boat trips, *not* the raw interview values.

Area	Quantity	Mean	Lower 95%	Upper 95%
Below Johnson R.	Salmon/Boat	16	10	22
Above Johnson R.	Salmon/Boat	7	6	9
Below Johnson R.	Ratio	1.3	0.8	1.7
Above Johnson R.	Ratio	1.7	1.3	2.1

Figure 1. Distribution of relevant quantities from all collected drift boat interviews, excluding those conducted by USFWS law enforcement officers. BBH = Bethel boat harbor, CBM = community-based monitoring, FC = Bethel area fish camps.



Appendix A: Bethel Boat Harbor Interview Information Detailed Summaries

Information is for drift nets only

Column Meanings

- **Area**: The area of the river the trip occurred in
- **N**: The number of interviews with fishing reported in each area
- **Min**: the minimum value among all interviews conducted in each area
- **25%**: the value that 25% of the interview values fell below in each area
- **Mean**: the mean value among all interviews conducted in each area
- **75%**: the value that 75% of the interview values fell below in each area
- **Max**: the maximum value among all interviews conducted in each area

Table A1. Summary of catch rates for Chinook salmon by area (units are catch per 150 feet of net soaked for 1 hour).

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	0.2	0.3	0.9	0.8	3
Johnson R. - Napaskiak	25	0	0.2	1.3	1.5	6
Napaskiak - Akiachak	57	0	0	0.5	0.8	2.5
All	**90**	**0**	**0**	**0.7**	**1**	**6**

Table A2. Summary of catch per trip for Chinook salmon by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	1	1	4	6	8
Johnson R. - Napaskiak	25	0	1	3	5	10
Napaskiak - Akiachak	57	0	0	1	2	7
All	**90**	**0**	**0**	**2**	**3**	**10**

Table A3. Summary of catch rates for chum/sockeye salmon by area (units are catch per 150 feet of net soaked for 1 hour).

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	0.2	0.5	1.8	1.9	6.6
Johnson R. - Napaskiak	25	0	0	1.4	1.6	10
Napaskiak - Akiachak	57	0	0	1.3	2	6
All	**90**	**0**	**0**	**1.3**	**2**	**10**

Table A4. Summary of catch per trip for chum/sockeye salmon by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	1	4	7	8	18
Johnson R. - Napaskiak	25	0	0	4	8	15
Napaskiak - Akiachak	57	0	0	3	5	15
All	**90**	**0**	**0**	**4**	**6**	**18**

Table A5. Summary of species ratios (chum/sockeye:Chinook salmon) by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	0.2	1	2.3	3.2	6
Johnson R. - Napaskiak	25	0	0	1.7	2	9
Napaskiak - Akiachak	57	0	0.6	2	2.4	10
All	**90**	**0**	**0.3**	**1.9**	**2.2**	**10**

Table A6. Summary of soak hours (the number of hours the net was actively fishing) by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8	1.5	2.8	4.2	5.2	6
Johnson R. - Napaskiak	25	0.5	1.3	3.2	6	6
Napaskiak - Akiachak	57	0.3	1.7	3.2	4.5	8.8
All	**90**	**0.3**	**1.7**	**3.3**	**5**	**8.8**

Table A7. Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	10:00am	10:56am	12:34pm	1:45pm	4:45pm
Johnson R. - Napaskiak	10:00am	12:00pm	1:12pm	2:00pm	7:00pm
Napaskiak - Akiachak	10:00am	12:00pm	3:01pm	6:00pm	9:00pm
All	**10:00am**	**12:00pm**	**2:17pm**	**4:30pm**	**9:00pm**

Table A8. Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
Tunt-Johnson	3:48pm	7:40pm	8:24pm	9:24pm	11:30pm
Johnson-Napaskiak	3:37pm	5:19pm	7:52pm	10:02pm	11:00pm
Napaskiak-Akiachak	2:14pm	6:49pm	8:09pm	9:50pm	11:50pm
All	**2:14pm**	**6:32pm**	**8:05pm**	**9:58pm**	**11:50pm**

Appendix B: Community-Based Monitoring Interview Information Detailed Summaries

Information is for drift nets only

Column Meanings

- **Area**: The village the interview occurred in
- **N**: The number of interviews conducted in each village
- **Min**: the minimum value among all interviews conducted in each village
- **25%**: the value that 25% of the interview values fell below in each village
- **Mean**: the mean value among all interviews conducted in each village
- **75%**: the value that 75% of the interview values fell below in each village
- **Max**: the maximum value among all interviews conducted in each village

Table B1. Summary of catch rates for Chinook salmon by village (units are catch per 150 feet of net soaked for 1 hour).

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	0.4	0.7	1.1	1.2	3
Napakiak	8	0	0.4	0.8	1.3	2
Napaskiak	11	0	0.2	0.6	0.9	1.6
Kwethluk	7	0	0.3	1.3	1.4	5
Akiak	8	0.1	0.3	0.9	1.4	2.4
All	**44**	**0**	**0.3**	**0.9**	**1.3**	**5**

Table B2. Summary of catch per trip for Chinook salmon by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	4	5	10	12	30
Napakiak	8	0	1	2	2	9
Napaskiak	11	0	0	3	6	6
Kwethluk	7	0	2	4	7	10
Akiak	8	1	2	6	7	15
All	**44**	**0**	**0**	**0**	**0**	**0**

Table B3. Summary of catch rates for chum/sockeye salmon by village (units are catch per 150 feet of net soaked for 1 hour).

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	0	0	1	1	3
Napakiak	8	0	0	2	3	5
Napaskiak	11	0	1	2	2	7
Kwethluk	7	0	0	1	2	4
Akiak	8	0	1	1	1	1
All	**44**	**0**	**0**	**1**	**2**	**7**

Table B4. Summary of catch per trip for chum/sockeye salmon by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	0	3	8	12	26
Napakiak	8	0	1	4	7	10
Napaskiak	11	1	2	7	9	26
Kwethluk	7	1	2	4	7	7
Akiak	8	1	4	5	6	11
All	**44**	**0**	**2**	**6**	**7**	**26**

Table B5. Summary of species ratios by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	0	0.4	0.9	1.4	2.1
Napakiak	8	0	1.1	3	4.8	8
Napaskiak	11	0.2	0.9	2	2.6	5
Kwethluk	7	0.3	0.6	1.7	1.5	6
Akiak	8	0.2	0.6	2.2	3	6
All	**44**	**0**	**0.5**	**1.9**	**2**	**8**

Table B6. Summary of soak time by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	10	4	4	5	5	6
Napakiak	8	1	1	2	3	5
Napaskiak	11	2	3	4	4	6
Kwethluk	7	2	4	5	6	7
Akiak	8	4	6	7	8	9
All	**44**	**1**	**4**	**4**	**6**	**9**

Table B7. Summary of trip start time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	1:00pm	1:00pm	1:18pm	1:30pm	2:00pm
Napakiak	11:30am	12:00pm	12:39pm	1:00pm	3:30pm
Napaskiak	12:00pm	12:08pm	12:50pm	1:15pm	3:30pm
Kwethluk	12:00pm	12:00pm	12:51pm	12:45pm	4:30pm
Akiak	11:45am	12:00pm	12:22pm	12:30pm	1:45pm
All	**11:30am**	**12:00pm**	**12:50pm**	**1:08pm**	**4:30pm**

Table B8. Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	5:00pm	6:08pm	6:35pm	7:00pm	8:00pm
Napakiak	1:00pm	3:57pm	5:19pm	7:19pm	7:30pm
Napaskiak	3:45pm	4:15pm	5:01pm	6:00pm	6:30pm
Kwethluk	4:30pm	6:38pm	8:25pm	10:22pm	11:38pm
Akiak	8:00pm	9:52pm	10:11pm	11:08pm	11:30pm
All	**1:00pm**	**4:56pm**	**6:55pm**	**8:11pm**	**11:38pm**

Figure B1. Visual of the interviewed fishers' progress at meeting harvest goals for each three salmon species of interest. The height of the point/grey area is interpretted as the percent of interviewed fishers that have met at least the category on the horizonal axis. More grey on the left indicates fishers are close to meeting needs, less grey on left indicates fishers are far from meeting needs.